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GEOGRAPHICAL RECORD.

AFRICA.

DIAMONDS IN GERMAN SOUTH-WEST AFRICA.—*The Board of Trade Journal* (No. 621) says that the British Embassy at Berlin reports the announcement of the discovery of a diamond field near Lüderitz Bay. Crystals sent to Amsterdam to be examined have been favourably reported upon. At about the end of August, 2,000 stones had been found, most of them weighing about two-thirds of a carat, though some weighed seven-eighths of a carat and were about the size of peas. The German Colonial Society for South-West Africa has been formed for the working of the mines, and the Imperial Colonial Office has exempted from the general right of digging for minerals the district in which the diamonds have been found in large quantities. In accordance with a decree published in the *Reichs-Kolonialblatt* of Oct. 1, the new Society will acquire complete control of the prospecting for and working of minerals, except as against the already well-established rights of third parties, in the region bounded north by 26° S, on the south by the Orange River, on the west by the Atlantic and on the east by a line parallel to it and 100 kilometers from it.

Another report says that these diamonds did not originate in a blue-earth volcanic formation such as that which yields the Kimberley gems, but, as in Brazil, they occur in granite, the disintegration of which has scattered many of them through the coastal sands. The blue-earth formation, however, has recently been discovered in the colony at Gibeon and diamonds have been found in it.

CLIMATE AND THE VEILS OF THE TUAREGS.—A curious custom prevails among the Tuaregs of the central Saharan plateau, which has frequently been mentioned in geographical literature. These people habitually wear a veil, which is not even removed when they eat and sleep. Only the eyes are visible. This habit of veil-wearing has gained for these people the name of *Ahel-el-litham,* or "people of the veil," and the Arabic name of *Molathemin,* the "veiled." It has generally been believed that the Tuaregs wear their veils as a protection against the fine sand and dust of the desert. In his recent book, "Across Widest Africa," Mr. A. Henry Savage Landor points out that there are also other explanations. Some people say that the veils are worn because the Tuaregs do not wish to be recognized by their enemies. Others give a climatic reason, saying that it is done in order to keep moisture at the entrance of the respiratory organs in the dry atmosphere of the desert. Mr. Landor himself thinks that the habit is merely the outcome of fashion. The women of the Tuaregs never wear veils, and seem in good health. R. DEC. W.

AMERICA.

PETROLEUM IN ILLINOIS.—Mr. David T. Day, in his report on the "Production of Petroleum in 1907," just published by the U. S. Geological Survey, says that the rapidity with which the Illinois oil field developed was the most surprising feature of the world's petroleum industry in 1907. The existence of petroleum in that State has been recognized for many years and a slight production was noted; but it was not till 1905 that careful drilling in the neighbourhood of Casey, in Clark County, developed wells sufficiently productive to indicate a large and profitable field. In 1905, the product amounted to only 181,084 barrels. In 1906, this increased to 4,397,050 barrels, and again fivefold in 1907, to 24,281,973 barrels. The entire product came from Crawford, Clark, Lawrence, Cumberland, Coles, and Edgar Counties, most of it from the first three named. Three of these counties front on the Wabash River, the eastern boundary of the southern part of the State and the three others join the Wabash counties on the west.

THE OKLAHOMA GEOLOGICAL SURVEY.—Prof. Charles N. Gould writes in a letter to *Science* (No. 718) that the Oklahoma Geological Survey, established by the first Legislature of the State, will have its headquarters at the State University, Normal, until suitable laboratories, libraries, and apparatus are provided for it. The Survey has begun the preparation of reports on building stone, road material, oil and gas. Several parties were put into the field to secure material for these reports. A geologic map of Oklahoma is being prepared and it is the intention to publish preliminary reports on the oil and gas regions, the available road material, the building stone of the State, and the economic resources of the Arbuckle Mountains.

THE VIRGINIA GEOLOGICAL SURVEY.—This Survey has been established by the General Assembly of the State with headquarters at the University of Virginia, Charlottesville. It is under the direction of a Commission, composed of Gov. Swanson (chairman); President Alderman of the University of Virginia; President Barringer of the Virginia Polytechnic Institute; Superintendent Nichols of the Virginia Military Institute; and A. M. Bowman, of Salem, Va.; Dr. Thomas L. Watson, Professor of Economic Geology in the University of Virginia, has been elected Director; Dr. J. S. Grasty, of the Maryland Geological Survey, assistant geologist; and Mr. Wm. M. Thornton, Jr., of the University of Virginia, chemist. The Survey has begun work on the geology of the coastal plain region, including the underground water resources; cement and cement materials; topography and geology of the Virgilina copper district; geology of the rutile deposits; and building and ornamental stones. The studies of the coastal plain geology and topographic mapping of the Virgilina district are in coöperation with the U. S. Geological Survey.

EXCURSION OF SCIENTIFIC MEN THROUGH THE CANADIAN ROCKY MOUNTAINS.—After the meeting of the British Association for the Advancement of Science at Winnipeg, Can., in the last week of August next year, there will be an excursion by special train to Vancouver, B. C., with stops at Banff, Glacier, and other points. To members of the British and American Associations the trip will be made for one fare, or $50. An excursion from Vancouver to Alaska and, perhaps, to still more distant points is under consideration. The usual dues of a sovereign will be remitted to members of the American Association attending the meetings. It is hoped that the occasion will be notable by reason of the large number of British, Canadian, and American scientists brought together.

THE FIRST PAN-AMERICAN SCIENTIFIC CONGRESS.—This Congress will be held in Santiago under the auspices of the Republic of Chile from Dec. 25, 1908, to Jan. 5, 1909. The literary programme is very long and can scarcely be compressed into the ten days assigned for the meeting. International law, American economic questions, criminology, literature and art in America, and many other topics will be discussed. Most of the American States will be represented and the sum of $35,000 was appropriated for the representation of our country, headed by Mr. Holmes, the ethnologist. The programme relating to American Anthropology includes many papers.

POPULATION OF CHILE.—The *Bollettino* of the Italian Geographical Society reports (August, 1908) that the official census of Chile taken on Nov. 28, 1907, shows a population of 3,248,224 inhabitants, an increase of 536,079 inhabitants since the census of 1895. Since 1835, the population has increased more than threefold, due almost entirely to natural growth, as immigration has been very small.

ASIA.

THE NEW PEKING.—An article in the London *Times* (Weekly, Oct. 2, 1908) says that to those who knew the Peking of the last decade of the 19th century, the contrast offered by the city of to-day is very striking. In no part of the Empire are there more impressive evidences of fusion and change than those which confront the visitor in Peking. Three railroads bring their traffic to the gates of the city. The tinkling camel bells of the caravans are no longer heard. They have been replaced by the indefatigable bugling from school parade grounds and camps. The mediæval watch no longer patrols the midnight streets with noise of rattle and drum, for the new police, with their foreign uniforms, rifles, and sentry boxes in every quarter, have consigned it to oblivion. The streets that were once filth-strewn are now well paved and flanked by brick drains. The paper lanterns that accentuated the darkness of former days have been replaced by electric lights. Scavengering is no longer left to pariah dogs and pigs. Broughams and jinrikshas ply in the place of sedan chairs and springless carts. A remarkable indication of the change in social and educational standards is the new zoölogical and botanical garden, whither large crowds of both sexes resort daily. Any one would have been thought crazy who had predicted in 1900 that in less than ten years a foreign adviser to the Chinese Government would be driven in an automobile, in company with a member of the Grand Council, from the city to the Summer Palace; or, that Chinese newspapers, printed in the capital, would freely discuss the necessity for constitutional government. Yet these things and others equally remarkable have come to pass.

THE NEW FLORA OF KRAKATAU.—Recent visitors to Martinique report the rapid growth of vegetation in the region that was buried under the débris from Mont Pelé in the great cataclysm of 1902. Similar reports come from the famous volcano of Krakatau, whose eruption in 1883 destroyed every vestige of plant life on it. An account of the recovering of what was left of the island by vegetation is given in the *Geographical Journal* (Oct., 1908, p. 428). The volcano has afforded an unusually instructive object lesson on the colonization of new land by vegetation. Dr. Treub of the Buitenzorg Botanic Garden, Java, visited the island in 1886 and 1897 and studied the early stages of the re-occupation of the island by plants. He observed that an unusually important part was being played by the wind as compared with other agencies, in transporting seeds, spores, etc., to the unoccupied surface. Thus, while in the cases of coral and other low-lying islands the shore vegetation has been most rapidly developed, in the case of Krakatau the inland species (particularly ferns), made good their footing just as quickly and in even greater numbers.

Prof. A. Ernst of Zürich visited Krakatau and the neighbouring parts of the Straits of Sunda in April, 1906. His visit and its results are described in the *Vierteljahrsschrift der Naturforschenden Gesellschaft in Zürich,* Jahrgang 52, Parts 3-4 (Zürich, Fasi u. Beer, 1908). He was struck with the astonishing progress made by vegetation, almost the whole south-east side, from the shore to the summit, being clothed in green. The present flora embraces all sections of the vegetable kingdom and the number of species amounts to 137. The chemical composition of the soil and its physical properties, since the eruption, are not so unfavourable as might be supposed. Apart from nitrates and phosphates, all substances necessary to plant growth are present in the volcanic deposits, while the missing constituents are supplied by winds, waves, rain, etc. Both algæ and bacteria play an important part in preparing the soil for plant-life. Winds, currents, birds, etc., transport plants and their seeds to the island. The important part played by the wind may be explained by the nearness of the island to other lands, which permits the transport by wind of the seeds of such orders as *Gramineae, Cyperaceae,* and *Orchideae,* as well as the spores of ferns. It is not easy to decide on the proportion of the flora brought by each agency, but Prof. Ernst concludes that from 39 to 72 per cent. have been brought by currents, 10 to 19 per cent. by birds, and from 16 to 30 per cent. by the wind. Apart from the number of species, it is surprising how far the differentiation into plant-associations has already progressed.

LATEST ACHIEVEMENT OF DR. AND MRS. WORKMAN.—The *Pioneer Mail* of India says that these distinguished American mountaineers, accompanied by Dr. C. Calciati and Dr. M. Koncza, Surveyors, have carried out successfully a detailed survey of the Hispar Glacier in Hunza-Nagar. After remaining five weeks on the Hispar Glacier, camping much of the time on the snow at altitudes varying from 16,000 to 19,000 feet, the party, with guides, and a caravan of Nagar coolies, crossed the Hispar Pass and descended the Biafo Glacier, 30 miles long, reaching Askole, Baltistan, on Aug. 26. The chief objects of the expedition were glacier study and mapping, but several new peaks and snow passes were climbed, the most notable being a very steep and difficult snow peak, about 2,000 feet high, situated some distance to the north of the Hispar Pass on the watershed of the Hispar and Biafo Glaciers, overlooking the solitudes of Snow Lake at the head of the Biafo Glacier. This is the second traverse of these two glaciers, the first having been made by Sir Martin Conway in 1892.

THE SURVEY OF INDIA.—In the report of Col. F. B. Long, Surveyor General of India, for the year ending Sept. 30, 1906, he says that the total outturn of detailed topographical and forest surveys on all scales was 23,312 square miles. The publication of the general maps of India has been delayed, partly by administrative changes and later because the symbols regarding the external boundaries of India have not been settled. The new map on a scale of 32 miles to an inch, sanctioned and begun six years ago, was still unpublished when the report closed.

Dr. Sven Hedin.—After his arrival at Simla, Dr. Hedin delivered a lecture on his discoveries in Tibet in which he said that, although little is left in that country in the way of geographical discovery, much remains to be done in geography. He is of the opinion that from two to three years will be required to work up the mass of scientific information collected by him relating to tracts hitherto unknown to the Western nations. He sailed from Bombay for Yokohama on Oct. 13. He expects to complete the writing of the popular account of his recent Tibetan travels by next May.

POLAR.

Rasmussen returns from Greenland.—Mr. Knud Rasmussen, the ethnologist, returned to Copenhagen in July from his second Greenland journey. He expects to organize an expedition through Arctic America west of Bering Strait for the study of the Eskimo tribes living there. His last journey was preparatory to this larger enterprise. Accompanied by his sister, he travelled in the summer of 1906 through Danish West Greenland and across Melville Bay to the Eskimos living on the east side of Smith Sound, where he again spent a winter with them. In May, 1907, he crossed the northern end of Smith Sound, accompanied by two Eskimos and reached Ellesmere Land at Cape Camperdown. This point is only a short distance north of Cape Sabine where many of the Greely party died of starvation, but Rasmussen was so fortunate as to meet many musk-oxen there and he reports that all conditions are favourable for his proposed undertaking. He remained some weeks in Ellesmere Land and then recrossed Smith Sound and made his way across the ice of Melville Bay to the Danish colonies, where he spent last winter.

The French Arctic Expedition.—News has been received from the French Arctic expedition, under command of Captain Bénard, that went north in April last to engage in exploration and investigate the possibility of establishing profitable fisheries in Barents Sea (p. 423). Their ship, the *Jacques Cartier,* touched at Hammerfest, crossed Barents Sea and reached Bailutsia Fiord in Novaya Zemlia, where several hitherto unknown fiords were discovered. The expedition shot a goose on July 14, the first fresh food obtained for three months. On July 25, the first sledge expedition left the ship with provisions for twenty days, intending to cross Novaya Zemlia from west to east. It was followed six days later by a second party. The expedition will probably not winter in Barents Sea, but will return to Norway and remain there till spring.

Antarctic Meteorology.—When the results of the four most recent Antarctic expeditions are completed, they will form an Antarctic library of about 30 large quarto volumes. The full official statement of the meteorological results of the National Antarctic expedition in the *Discovery* is now completed and has been published by the Royal Society in a quarto volume of some 550 pages, prepared under the superintendence of the Director of the Meteorological office, Dr. W. N. Shaw. Mr. L. C. Bernacchi, physicist to this expedition, has written a review of the volume in *Symons's Meteorological Magazine* (Oct., 1908), from which the following facts are taken:

The meteorological work at the winter quarters of the *Discovery* (Lat. 77° 50′

50″ S.; Long. 166° 55′ 45″ E.) were continuous from Feb., 1902, to March, 1904, over two years. Observations were made every two hours. The mean temperature from Feb 9, 1902, to Jan. 31, 1904, was —1.7°, the mean for the first year being 0.4° and for the second, —3.0°. The lowest mean temperature for any one month was —21.1° for July, 1903, and the highest mean temperature, 26.1° for January, 1903. The absolute maximum temperature observed was 39.0° in the first year and 42.0° in the second; both during the month of December. The absolute minimum temperature was —50.5° in the first year and —58.5° in the second, the first being in August and the second in September.

The winter quarters were warmer than some others in the locality. Corresponding minimum temperatures at Cape Armitage, in a more exposed position on the barrier surface, were —62° and —64.6°, respectively. The lowest temperature noted was at Cape Armitage, on May 16, 1903, when the spirit minimum indicated —67.7°. Minimum temperatures of —52.0°, —58.5°, —61.2°, and —64.6° were noted on different sledge journeys during the early spring of 1902 and 1903.

Fluctuations of temperature were rapid and violent at all seasons. Increase of temperature, especially during the winter, was associated with a wind from the pole. The range of temperature during the winter months of June, July, and August, 1903, was 64.0°, 66.2°, and 65.0°, respectively. The maximum range for the year, 1903, was 100.5°.

The summers were very cold, only a few days giving a mean temperature above freezing. A low summer temperature is characteristic of the Antarctic regions. The large mass of land ice and the remarkable dryness of the air would seem to be partly responsible for this. There is an abundance of bright sunshine in the summer, the total amount for 1903 being equal to that of Scilly.

The barometer stands higher in that region than in more northern parts of the Antarctic, where observations have been obtained. The common semi-diurnal oscillation is clearly shown, amounting to about 0.002 inch with maxima at about 10 A. M. and 10 P. M. at all seasons of the year. The highest pressure observed was 30.181 inches and the lowest, 28.140 inches. The surface winds at the ship were chiefly easterly, just as they were at Cape Adare and on the German ship *Gauss*. All the observations taken on the sledge journeys clearly indicate that the direction of the prevailing wind at some distance away from the littoral is south-westerly.

EDUCATIONAL.

Professor Penck's Lectures.—Professor Penck of the University of Berlin began his course of lectures in the Peabody Museum of Natural History, Yale University, on Oct. 13. The subject of the 10 lectures was Problems of Glacial Geology: 1, Glaciers and Climate; 2, Glaciers and Water; 3, Glaciers and Moraines; 4, Older Moraines and Glaciers of the Great Ice Age; 5, Climate of the Ice Age; 6, Different Glacial Systems; 7, Interglacial Times; 8, Chronology of the Great Ice Age; 9, Antiquity of Man; 10, Glacial Earth Sculpture.

Professor Penck began his course of lectures in Columbia University on Nov. 4. The subject of the inaugural lecture was: "The Face of the Earth." He is Kaiser Wilhelm Professor in Columbia University for the year 1908-9.

On the 24th of November Prof. Penck will address the American Geographical Society on The Origin of the Alps.

GEOGRAPHY AT EDINBURGH UNIVERSITY.—Mr. Chisholm's course in Edinburgh University during the coming winter session will embrace about 75 lectures, delivered daily during the session. The syllabus which appears among the courses for graduation in Arts in the University *Calendar* includes lectures under the headings: Scope of Geography, Cartography, Form of the Earth, Distribution of Land and Water, Meteorology and Climatology, Typical Land Forms and their Relation to Rock-Structure, Economic Geography, Political Geography, History of Geographical Ideas, Progress of Discovery, and Elementary Principles of Surveying.

THE BERLIN GEOGRAPHICAL INSTITUTE.—In view of the fact that exceptional opportunities for the study of geography are given by this Institute, the description of it and its work by Grace Meiklejohn (*Scot. Geog. Mag.*, No. 10, 1908) will interest many American geographers. A condensation of the article is presented here.

The geographical work of the Berlin University is carried on chiefly in the Geographical Institute which was founded by Baron von Richthofen in 1887 and now occupies the upper story of the Oceanographic Museum, near the University. The rooms include a lecture hall, map room, workroom, drawing department and library. The lecture hall is well supplied with blackboards, has a wall relief of the Alps on a scale large enough to adapt it for class demonstration, and the hall may instantly be darkened for the use of a lantern.

The collections in the map room are admirable. They include a large number of the topographical and geological survey maps of the various countries, large wall maps, reliefs, instruments, both for field and indoor work, and the morphological collections both of the Institute and Prof. Penck. The atlases are kept in the workroom where there are long tables for laboratory work.

The library contains rather less than 4,000 volumes, in addition to the geographical pamphlets of the late Baron von Richthofen, which have now been added to it. The books are arranged by subjects. One division contains works on oceanography; another, on mathematical geography and so on. The upper part of this floor is devoted to standard works on regional geography, geological survey reports, geographical periodicals, etc. Writing tables are provided for the students, who are enabled to use the library with every comfort.

In the drawing department draughting tables, colours, instruments for enlarging and diminishing maps and everything required for map drawing are provided.

The lectures cover a very wide field. In the winter session of 1907-8 Prof. Penck lectured every day on "Europe," and twice a week on "The Atmosphere." The subject of his daily lecture during the summer session was "Mountains." The subjects of Prof. Grund's lectures during the school year were "Oceanography," "Applied Oceanography" (a continuation of the earlier course), "The Polar Regions" and "The Balkan Peninsula and Asia Minor." Each of these topics was treated in an extended course.

Map drawing and field work are under the charge of Prof. Groll. Map work of all kinds is carried on by students under the direction of a professor. Students may be engaged for many weeks working up some particular region, often one that they have studied on the spot during a spring or summer vacation. Students had an opportunity last summer, during the illness of Prof. Groll, to join Sunday excursions for field surveying under the leadership of an officer in the German Army.

Among the most interesting features of the work are the evening meetings under the guidance of Prof. Penck and Prof. Grund. The younger students meet every Friday evening from 6 to 8. One of their number reads a paper upon such topics as "Coral Islands," "Circulation of Underground Water," "Sand Dunes," "Exploration of Australia" etc. (these topics were among those of 1907-8), and a discussion follows in which professor and students take part. The evening meetings for advanced students are held on Tuesdays and are attended by men who are working for their degree and also by outsiders, such as school teachers, who thus keep in touch with the problems that are now interesting geographers. The papers are usually the outcome of practical, original work done by the students. Lectures at these meetings are also delivered by guests invited by Prof. Penck. Thus, last year, Lieut. Filchner lectured on his work in Tibet and Dr. Frank Leverett on "Glaciation in the United States." After the lecture, there is discussion and the lecturer asks and answers questions. These meetings also last for two hours but the interest in the discussions is often so keen that the time is extended.

The scientific excursions are from one to several days in length. The Whitsuntide excursion last year was a five-days' walking tour in Thuringia and during it valley formation was chiefly studied. Students often carry on practical work in the longer holidays, but this is at their own expense.

The Institute is under the management of Prof. Penck, who is assisted by Dr. Quelle and the custodian, Mr. Baschin. Prof. Penck is also Director of the Oceanographic Museum.

BIBLIOGRAPHIES FOR TEACHERS.—The Committee of the Association of American Geographers, in charge of work relating to educational map material and geographical reference and text-books, will submit at the Baltimore meeting this winter lists of cartographic and literary material, published in several languages, in the hope that these lists may prove helpful to normal school classes in geography and to teachers; also, a list of the best histories of cartography now available, showing its evolution, its present methods and its efficiency in geographical education.

The American Federation of Teachers of the Mathematical and Natural Sciences has in progress a bibliography for reference in teaching the several sciences which, it is expected, will be completed before January 1, 1909, and published immediately thereafter.

It is announced that Dr. H. R. Mill's small volume containing a selected bibliography of geographical works will soon be issued in a new edition under the auspices of the Geographical Association of Great Britain.

GEOGRAPHY AT THE BRITISH ASSOCIATION.—The Geographical Section at Dublin had excellent accommodations in the Royal Dublin Society's building, on the opening day of the meeting, Sept. 3. Major E. H. Hills read a paper on the Survey of the British Empire, which amounted to a plea for the more thorough organization of the Imperial Survey. One of his most notable recommendations was that the remeasurement of the two principal arcs, meridional and longitudinal, should be undertaken by the British Ordnance Survey. This recommendation was afterwards sent as a resolution to the Council of the Association. Professor W. M. Davis of Harvard gave two brilliant lectures, one on the physiographic subdivisions of the Appalachian Mountain system and the other on the Colorado

Cañon. On Friday large audiences were attracted by papers on geographical education. The gist of Prof. R. A. Gregory's paper on "School Geography as a Mental Discipline" and of the discussion that followed it was that geographical causes and their political, economical or other effects must be taught in an orderly perspective, and it is desirable not merely to present facts and their reasons to the student, but also to train him to deduce reasons from facts for himself. Dr. A. J. Herbertson laid stress on the utility of work in the field and also of instruction in the reading of maps and all the inferences to be drawn from cartographical representation. Prof. J. L. Myres in a paper said that the "classical education," as generally conceived, takes no account of geographical environment, though only the study of that environment can provide a proper background for the picture which it was desired to impress upon the minds of students. Mr. W. L. Grant, in a lecture on the northward expansion of Canada, brought out the idea, new to many of his hearers, that in the development of the Canadian northwest railroad construction must precede instead of following settlement.

On Monday, Sept. 7, Mr. E. A. Reeves exhibited and explained three instruments designed by him for the use of surveyors and travellers; (1) a distance-finder alidade for plane-tabling; (2) an astronomical compass and time-indicator (3) a new form of reflecting artificial horizon. Mr. H. G. Fordham read a paper on "Notes on the Cartography of the Counties of England and Wales," in which he brought out the fact that the plates of some maps still issued for travellers are about a century old, though, of course, brought up to date. Captain H. G. Lyons, of the Egyptian Survey, read a paper on the longitudinal section of the Nile, showing that an almost complete line of levelling exists along the river from Victoria Nyanza to the Mediterranean, 3,500 miles. The slope of the main river, after it debouches from the elevated equatorial plateau upon the level plain of the Sudan, is only 3 inches, or a little more, to the mile. The flattest part of the whole course is between the Sobat and Khartum, where the slope is from one-half to one-third of an inch to a mile. On Tuesday, the Rev. George Furlong read a paper, entitled "Unique Experiences at the Birth of a Volcano." He was a missionary in Savaii, Samoa, when the volcano of O Le Mauga Mu broke into life and he observed and photographed, often under great difficulties, the phenomena accompanying the outbreak and the opening and building up of the crater. Some of his photographs were highly impressive, especially those of the eruption of steam where the hot lava flow reached the sea. Among the other contributors to the programme were Dr. W. S. Bruce, who gave an account of his survey and other scientific work on the island of Prince Charles Foreland in the Spitzbergen group, and Mr. L. C. Bernacchi, well known for his Antarctic work in the *Discovery* expedition, who gave an account of his journey in the little explored Rio Inambari region of Peru, where a new field for the rubber trade is opening up.

VARIOUS.

ICE AND ITS NATURAL HISTORY.—The Society has received from Mr. John Y. Buchanan a copy of the paper which he read before the Royal Institution of Great Britain on May 8 last on those points in the natural history of ice which he has made the subject of special investigation. On experimental evidence he has established the fact that, when a non-saturated saline solution is gradually frozen the ice crystals separate out and are pure ice and that the salt from which they cannot be freed belongs to the adhering brine; also, that when water which holds salt in solution freezes at a temperature below 0° C., the salt forms no part of the ice produced; but it is the cause of lowering the freezing-point, for, if it is removed, the freezing-point reverts to the normal.

After treating of various phases of the physical nature of ice, such as the granular constitution of glacier ice, the size of glacier grains, etc., the author describes the scoring and grooving of glacier ice by opposing rocks and then gives nearly half of the monograph to a discussion of the external work of a glacier. In its physiographic relations, he finds that ice is as efficient a preserver of mineral matter as it is of vegetable or animal matter in the every-day relations of life. He also finds that the substance which chemists indicate by the symbol H_2O has the most destructive action on mineral matter when it has passed from the gaseous state in the atmosphere to the liquid state on the surface of the earth and when this takes place in regions where the atmospheric temperature is high. Chemical decomposition accompanied by disintegration is the result and it is followed by degradation under the all-pervading influence of gravity. This chemical and gravitational degradation is the primary process in the wasting of land substance:

> Owing to the enormous diminution in the amount of land ice in the course of the last half century we are accustomed to talk of the retreat of the glaciers. But a glacier never retreats; it stops advancing and melts where it stands. Even in a stationary glacier, however, the flow of the ice in all its parts continues; but its effect outside of the glacier is almost, if not quite, *nil*. In the stationary stage, its function in nature is conservation. In the advancing stage, it adds the function of distribution. Its destructive effect is very small. It protects the rock beneath it from weathering, which is a chemical process, by the constant maintenance of a low temperature and the practical exclusion of the atmosphere. Any destructive action which it exerts must therefore be mechanical.

Mr. Buchanan is not one of the geologists who believe in the great erosive power of glaciers. In his opinion they are responsible only for clearing the débris out of the valleys and distributing it over the plain. The production of the débris itself may be attributed to the warm inter-glacial periods and the existence of the débris, he thinks, furnishes the best evidence of the reality of a previous warm period.

RELATION OF RADIUM TO GEOLOGY.—The Vice-Presidential address by Prof. John Joly before the section of Geology at the recent meeting of the British Association for the Advancement of Science (printed in *Nature*, Sept. 10, 1908) is an important and carefully prepared discussion of the relation of uranium and radium to geology.. The wide distribution of radium in ocean deposits and in the rocks of the earth's crust is shown to have a probable bearing on some of the fundamental problems of geophysics, notably the question of the rate of cooling of the earth and estimates of its age, and the question of the formation of mountains and continents. Prof. Joly does not attempt to overturn geological theories, but finds support of these in the consideration of the probable effects of radio-thermal cooling. For instance, he says:

> Radium has occasioned no questioning of the older view that the cooling of the earth from a *consistentior status* has been mainly controlled by radiation. But, on the contrary, this new revelation of science has come to smooth over what difficulties attended the reconciliation of physical and geological evidence on the Kelvin hypothesis. It shows us how the advent of the present thermal state might be delayed, and geological time lengthened, so that Kelvin's forty or fifty million years might be reconciled with the hundred million years which some of us hold to be the reading of the records of denudation. .

One of the most interesting parts of Prof. Joly's address, from the standpoint of the physiographer, is that which deals with mountain formation. It has long been known that mountain uplifts follow long-continued periods of depression, great geosynclines being transformed to geanticlines. Many attempts have been made to account for this fact, but there is a general feeling that none of these attempts has been wholly satisfactory. Prof. Joly ingeniously introduces radio-thermal activity and puts forward a theory that has great plausibility, though it must be admitted that our knowledge of radium is as yet too imperfect to warrant an attempt at final conclusion. He shows that there is a zone of radium enrichment in surface deposits, and, upon this, the old crust, the deposits of the geosynclines accumulate. Now, since the rise of temperature through radio-thermal heating is proportional to the square of the thickness of the deposit, the heating of the lower layers finally causes a weakening of the crust along the line of the geosyncline. To quote Prof. Joly's words:

> Over the area of sedimentation, and more especially along the deepest line of synclinal depression, the crust of the globe, for a period, assumes the properties belonging to an earlier age, yielding up some of the rigidity which was the slow inheritance of secular cooling. Along this area of weakness —from its mode of formation generally much elongated in form—the stressed crust for many hundreds, perhaps thousands, of miles finds relief, and flexure takes place in the only possible direction; that is, on the whole, upwards.

Prof. Jòly does not attempt to supplant contraction as the motive cause for mountain formation, but merely to supplement it.

He also attempts to apply his theory to the formation of mountains in the ocean and to account for the former presence of continental lands now submerged Here his argument is somewhat less convincing, though ingenious and interesting. On the whole, this is a noteworthy contribution to the interpretation of earth history, and probably one of the forerunners of a long series of papers dealing with this new element in the problems of the present condition and past changes of the earth. R. S.'T.

GLACIAL EROSION.—Mr. E. C. Andrews has contributed several valuable papers on the subject of glacial erosion, especially with reference to conditions in New Zealand. His latest paper (Proc. Linnean Society of New South Wales, 1907, Vol. XXXII, pp. 795-834) is especially noteworthy for its statement of the flood hypothesis of glacial erosion. Mr. Andrews shows the characteristics of stream valleys produced under flood conditions and points out resemblances between such valleys and those caused by ice action. He calls attention to Gilbert's statement that both stream valleys and coast lines are adjusted to the needs of the flood stage, rather than the draught stage, and then applies Gilbert's principle to an interpretation of valley forms due to ice erosion. His conclusion is that glaciers erode mainly in flood stage, whereas during the stagnant stage their erosive action is relatively ineffective, as in the case of rivers. During the Glacial Period glaciers were in flood in many parts of the world; and then they were effective agents of erosion. Now they are in the drought stage and in most places are capable of little work of erosion. Most students of glacial erosion will accept this principle, which is so clearly and forcibly enunciated by Mr. Andrews. His paper is a distinct contribution to the literature of glacial erosion, not merely for the statement of this principle, but also for the details and comparative studies which it presents. R. S. T.

PERIODS OF ANCIENT GLACIATION.—The Pleistocene ice age, for a long time seemed a strange and almost impossible phenomenon; but it has long since become a commonplace, although we are yet unable satisfactorily to account for it. Some broad-minded scientists long ago hinted at probable earlier ice ages. Students of the late Professor Shaler now vividly recall his marshalling evidence, as much as fifteen or twenty years ago, to support this contention that there had been earlier periods of glaciation. Few of his students, devoted though they were to him and convinced of his genius, were quite able to grasp this conception. Now, however, every one is convinced of Permian glaciation in South Africa and elsewhere, just as he taught. It is peculiarly appropriate that the first research of the Shaler Memorial Fund should be to study the evidence of supposed Permian glaciation in Brazil.

We are now quite familiar with this period of glaciation, but less so with a still earlier one of which evidence is accumulating. Willis has brought forward facts which convince most students of glacial action of the presence of extensive continental glaciation in China prior to the Cambrian; and more recently (see especially his latest paper, *Journal of Geology,* Vol. XVI, 1908, pp. 149-158) Prof. Coleman has presented striking evidence of a "Lower Huronian Ice Age" in Canada, possibly contemporaneous with that of China. In a conglomerate from the silver-mining region of Cobalt he has found striated pebbles which have every appearance of being glacial in origin. The pebbles and boulders are in a matrix resembling till, and the whole rock is classed by Coleman as a "tillite," using the name applied to the South African glacial deposits. Tillite is a consolidated till or boulder clay, in this instance in placer metamorphosed to schist, and covering a wide area. While the evidence is not so convincing as that from South Africa, it is sufficiently strong to satisfy most students of the subject.

These ancient ice ages in various parts of the world now having temperate or even tropical climate, and at various periods of the earth's history, are almost startling. They are liable to have a wide-reaching influence on our conception of the earth as a habitable globe. Indeed, Coleman already suggests that we "should cease to speak of the earth as once a molten globe." Whatever the ultimate conclusion may be it certainly will be one in which we must needs explain phenomena that are utterly impossible in the present earth condition. R. S. T.

The latest "Beiheft" to the *Tropenpflanzer* (Vol. 9, No. 5) is a monograph on "Der Ixtle und seine Stammpflanzen" by Dr. Rud. Endlich, treating of henequen and its related fibres.

The United States Geographic Board has just issued in a pamphlet of 38 pages all its decisions from July, 1906, to July, 1908, including the names of the municipalities and barrios of Cuba, adopted by the Cuban Government and tentatively approved by the Government.

Dr. H. R. Mill announces in "British Rainfall in 1907" that after next January he intends to devote his whole strength to the study of rainfall. He has therefore resigned from many committees and has reluctantly given up his position as one of the British representatives to the International Council for the Study of the Sea, as he feels that it is no longer possible to keep pace with the rapidly expanding science of oceanography without encroaching upon the more pressing claims upon him.

The Royal Scottish Geographical Society has moved into new quarters at Synod Hall, Castle Terrace, Edinburgh, which provide much larger accommodation than the old rooms. There is a large area of wall space for the display of maps and pictures.

Mr. E. G. Ravenstein, the well-known British geographer, and Mrs. Ravenstein, celebrated the fiftieth anniversary of their wedding on Sept. 7 last and in connection with the event Mr. Ravenstein printed, for private circulation, a list of the most important maps, books and papers drawn, compiled or written by him from 1853 to the present time. The list fills 47 pages and bears witness to the great industry of this able geographer.

Cape Colony, following the example of this country, has undertaken to make a survey of the agricultural soils of the colony. The detailed results with black-and-white sketch maps are being printed, as the survey progresses, in the *Agricultural Journal* of the Cape of Good Hope.

Mr. G. T. Surface of the Central High School, Philadelphia, has been appointed Instructor in Geography at the Sheffield Scientific School, Yale University.

The *Journal of Geography* announces the formation of a Geographical Society in Cleveland, O., with a membership of over 260. Mr. W. M. Gregory of the Central High School was largely concerned in organizing it. Miss Bertha A. Brown of 7409 Linwood Ave., Cleveland, is Secretary of the Society.

Mr. R. H. Whitbeck of the Trenton (N. J.) State Model School is preparing a bibliography on the teaching of geography and geology.

NEW MAPS.

AFRICA.

EGYPT.—Egypt. Scale, 1:50,000, or 0.7 statute mile to an inch. Sheets: III-II N. E.; III-I, III-II, III-III S. W.; IV-I, IV-II S. E; IV-I, IV-II, IV-III S. W.; V-I S. E.; V-I, V-II S. W.; VI-I S. E.; VI-I and VI-II S. W.; VII-I, VII-II S. W.; VIII-I, VIII-II S. W. Survey Department, Cairo, Egypt, 1908. (Price 50 mills.)

A prominent feature of this map is the clearness with which roads, paths, and double or single and light railroads are shown. Canals and drains, with few exceptions, have bridle paths on both banks. The sheets are produced in three colours, black, blue and brown, the names being in Arabic, though the greater number of them are also printed in English. The map is chiefly designed for administrative purposes and is made by reducing the cadastral maps (1:10,000) to 1:25,000 and then reproducing them on the scale of 1:50,000.

AMERICA.

U. S. GEOLOGICAL SURVEY MAPS.

The U. S. Geological Survey has sent to the Society from Washington the following folios of the Geologic Atlas of the United States:

151—Roan Mountain Folio (Tenn.—N. C.). 36° and 36° 30′ N.; 82° and